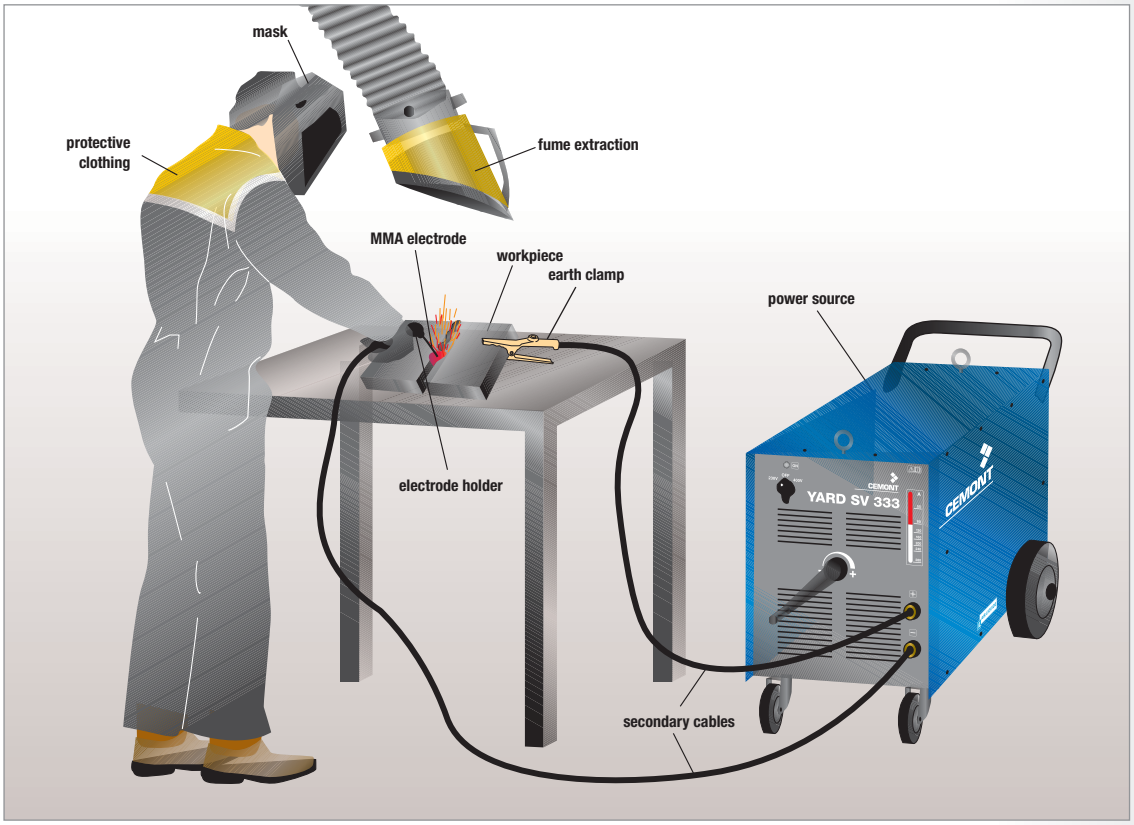
CHAPTER 2

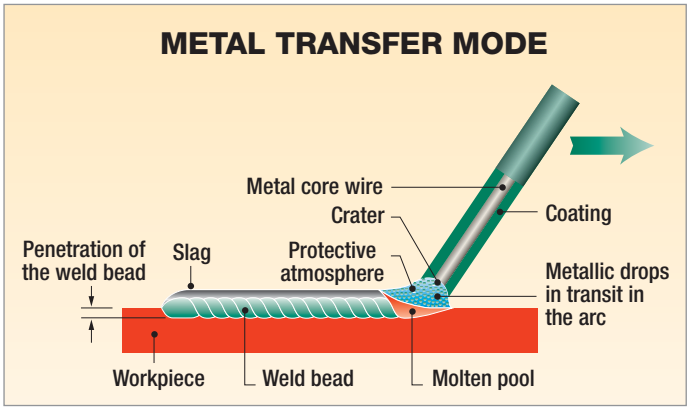
MMA welding power sources

CEMONT

MMA - electrode welding

A TYPICAL MANUAL METAL ARC ELECTRODE WELDING INSTALLATION





Process principles

The filler metal is transferred by an electric arc between the core wire of the coated electrode and the work piece.

The heat emitted by the electric arc simultaneously melts the base metal (work piece), the metal core wire and the coating of the electrode, thus creating the weld pool that receives the droplets of melted filler metal and slag transferred into the plasma of the arc.

Constituents of the electrode coating are volatilised, thus helping to create the arc atmosphere. The low-density melted coating covers the weld pool and forms the slag that protects the deposited metal during and after solidification.

AIR LIQUIDE WELDING

Duty cycle

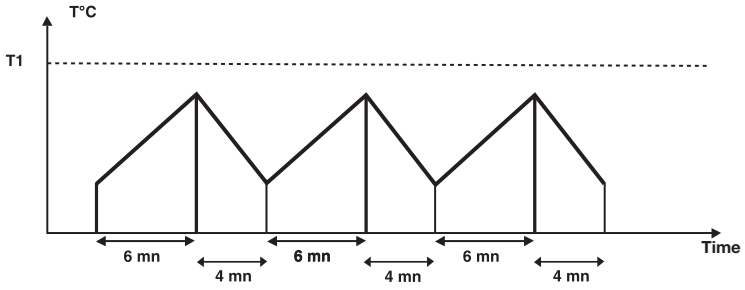
Defined by standard EN 60974-1

Working cycle ..... 10 minutes
At ambient temperature ..... 40 °C

Example: 250 A at 60% means that in a temperature-stabilised cycle, the current source can supply 250 A with a cycle of 6 minutes of welding and 4 minutes of stoppage.

With a 100% duty cycle, the source of current can continuously supply the corresponding intensity with an ambient temperature of 40 °C.

T1: Temperature of triggering by the thermal safety system



Protection index IP

Meaning: IP 2 3 or 2 1

2 means that an object of more than 12.5 mm diameter cannot enter or come into contact with an internal element with a hazardous voltage.

3 means that the current source is protected from all damage during use by water falling at a maximum angle of 60°.

1 means that the current source is protected from vertical falling water.

MMA electrodes

MMA electrodes are made up of a metal wire called the core wire and a mineral coating.

Role of the coating:

- Encouraging electrode striking.
- Protecting the deposited metal from oxidation by the ambient air (formation of slag).
- Controls the deposited metal mechanical properties.

The two most common types of coating:

- Rutile
- Basic

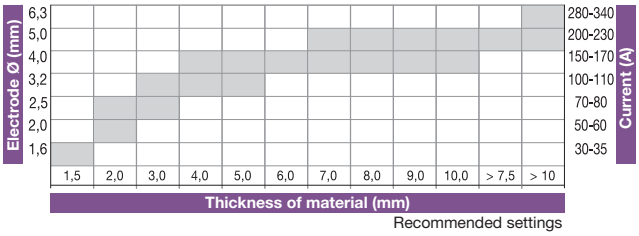
Rutile electrodes:

- **These work with all types of power source, using:**

- **Alternating current (AC),** if the open-circuit voltage of the machine (Uo) is above 65 V - 70 V.
- **Direct current (DC),** if the electrode is connected to the - pole.

Basic electrodes:

- **Applications:** Work requiring welding metal that needs to have high mechanical characteristics, particularly toughness, i.e. resistance to impact and fracture at low temperatures.



Recommended settings

Example: *construction of bridges, wagons, structures, pressure devices etc., all assemblies subject to high stress. The use of basic coated electrodes may require re-drying the electrodes at 350 °C for two hours in order to eliminate as much of the moisture in the coating as possible, which generates the release of hydrogen during use, which can lead to cracking.*

LEXICON

ARC WELDING

Hot Start:
Makes striking easier with over-intensity upon starting up. It may be automatic or adjustable from the front of the unit.

Arc Force:
Prevents sticking in the bath during welding. An electronic system detects abnormal closeness between the metal core and the work piece and provides extra energy to return to normal conditions.

U0 no-load voltage:
That is the voltage between the welding and earth terminals of the power source. It must be greater than the electrode striking voltage (indicated on each electrode pack).

Electrode efficiency:
The addition of iron powder to the coating makes it possible to increase the efficiency of the deposited metal.

Example:

- *Electrode with conventional coating A 100-g core deposits 100 g of bead.*
- *Electrode with 120% efficiency A 100-g core deposits 120 g of bead.*

Recommended settings:
Formula for approximating the correct intensity setting depending on the diameter of the electrodes:

(Ø - 1) x 50 = Welding intensity.

Example: with an electrode with a 2.5-mm diameter (2.5 - 1) x 50 = 75 A.

The CEMONT offer, inverter technology

PUMA XL			**2000 XL** 		
PUMA POWER			**1700 POWER** 	 **2000 POWER**	
PUMA GC					 **SX 2200 GC**
PUMA G			**S 1700G** 		
PUMA S		 **S 1400**	 **S 1600**		
COLT	 **130G**		**150G** 		
SPEEDY II		**130** 	**150** 		
Welding current	125 A	130 A	150 A / 160A	180 A	220 A
Ø maxi. of the electrode	3.2 mm		4.0 mm		5.0 mm

The CEMONT offer, traditional technology

YARD STC					 **400 SX**	 **650 SX**
YARD SV		 **SV 263**	 **SV 333**	 **SV 403**	 **SV 443**	
Welding current	195 A	220 A	260 A	350 A	400 A	630 A
Ø maxi. of the electrode	4.0 mm	5.0 mm			6.3 mm	
	Single-phase	Three-phase				

AIR LIQUIDE WELDING

SPEEDY II 130 / 150

WARRANTY 2 YEARS

The new SPEEDY II power sources are the easiest, the safest and the most convenient way to weld all types of MMA electrode. Dedicated for light duty and maintenance activities.

- Ultra-light portable equipment.
- Single-phase unit with 16 A "domestic plug".
- Motor-generator compatible.
- IPM technology (Inverter Power Microcontroller) makes it extremely easy to use for welding in all positions.
- For electrodes up to diameter 3.2 mm (SPEEDY II 150).

2012-521

NEW

MOTOR GENERATOR COMPATIBLE

INVERTER POWER MICROCONTROLER I.P.M. TECHNOLOGY

Standards
EN 60974-1
EN 60974-10

Features and product advantages:

- Complete packaging
- Safe and reliable
- Excellent starting and arc stability due to the IPM technology with Arc Force and Hot Start linked to the welding current. Easy to use and high quality
- Single-phase 230 V unit
- Extra light: < 3.8 kg

2012-528

2012-610

1 Power potentiometer.
2 Warning light.
3 Switch on/off.

TECHNICAL CHARACTERISTICS:

		SPEEDY II 130	SPEEDY II 150
Single-phase input voltage		230 V - 50/60 Hz - +/- 10%	
Input power		6.8 kVA - 4 kW	8 kVA - 4.8 kW
Max input current		30 A	35 A
Effective input current		10 A	11 A
Open circuit voltage		69 V	
Welding current range		10 - 130 A	10 - 150 A
Duty cycle at 40°C (EN 60974-1)	at 10%	130 A	150 A
	at 60%	60 A	70 A
	at 100%	45 A	55 A
Connector size		9 mm	
Protection index		IP 21	
Dimensions		220 x 120 x 320 mm	
Weight		3.8 kg	

Delivered equipped with:

- Power source with primary cable equipped with a 16 A schuko plug
- Electrode holder and earth clamp with cables and connectors
- Brush/Chipping hammer
- Electrode small pack (rutile coating)
- Safety instructions and user manual
- Case

TO ORDER:

Complete packaging	W000373605	W000373604

COLT 130G / 150G

WARRANTY 2 YEARS

The range of COLT power sources, known all around the world for its exceptional power to weight ratio, now with full generator compatibility due to its new I.P.M. technology (Inverter Power Microcontroller).
This professional range is suitable for light duty and maintenance activities.

ULTRA-MOBILE READY TO USE

Standards
EN 60974-1
EN 60974-10

Features and product advantages:

- Compatible with motor-generators.
- Delivered ready to use in a plastic case with all accessories: Plug & Weld.
- Compatible with use in the domestic environment due to reduced electromagnetic emissions: the cleanest unit in its category.
- 2 years warranty. Safe and reliable.
- Excellent starting and arc stability due to the IPM technology with Arc Force and Hot Start linked to the welding current. Easy to use and high quality.
- Single-phase 230 V unit, extra light: < 3.8 kg.

MOTOR GENERATOR COMPATIBLE

TECHNICAL CHARACTERISTICS:

		COLT 130G	COLT 150G
Single-phase input voltage		230 V - 50/60 Hz	
Input power		6 kVA - 3.5 kW	7.45 kVA - 4.5 kW
Max input current		30 A	31 A
Effective input current		12 A	
Open circuit voltage		69 V	
Welding current range		10 - 120 A	10 - 140 A
Duty cycle at 40 °C (EN 60974-1)	at 15%	120 A	140 A
	at 60%	60 A	70 A
	at 100%	45 A	55 A
Connector size		9 mm	
Protection index		IP 23	
Dimensions		220 x 120 x 320 mm	
Weight		3.5 kg	3.8 kg

TO ORDER:

Power source complete with cose	**W000271548**	**W000271547**

Accessories
see page 2-16

Delivered equipped with:

- primary cable,
- welding cable with electrode holder,
- welding cable equipped with earth clamp,
- hammer / brush / helmet,
- pack of rutile electrodes,
- safety instructions,
- user manual,
- PVC case for transportation.

PUMA S 1400 / 1600 1700G

WARRANTY 2 YEARS

HEAVY DUTY

Standards
EN 60974-1
EN 60974-10

The PUMA power sources are for MMA coated electrode welding for both industrial and daily use.
A special version compatible with generators is available (1700G).
The PUMA range has been designed for on site use.

Features and product advantages:

- **Light weight:** less than 7 kg.
- **Versatile:** able to weld all types of MMA electrodes (steel / stainless steel etc…).
- **User friendly:** Hot Sart / anti-stick device.
- **Powerful:** high duty cycle at 40 °C.
- **Transportable:** using the shoulder strap.
- Generator compatability only PUMA 1700G.

2006-616

2006-614

1 Power potentiometer.
2 Switch on/off.
3 Warning light.

TECHNICAL CHARACTERISTICS:

	PUMA S 1400	PUMA S 1600	PUMA S 1700G
Single-phase input voltage		230 V	
Input power	6.5 kVA - 4 kW	7.3 kVA - 4.6 kW	7.3 kVA - 4.6 kW
Max input current	25.5 A	31 A	31 A
Effective input current	15 A	16 A	19 A
Open circuit voltage		85 V	
Welding current range	5 - 130 A	5 - 150 A	5 - 150 A
Duty cycle at 35%	130 A	150 A (25%)	150 A
at 60%	100 A	120 A	120 A
at 100%	80 A	100 A	100 A
Connector size		9 mm	
Protection index		IP 23	
Dimensions		145 x 230 x 365 mm	
Weight		7 kg	

Accessories
see page 2-16

Delivered equipped with:

- primary cable,
- safety instructions,
- user manual.

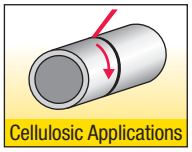
TO ORDER:

Power source only	**W000263627**	**W000263636**	**W000263650**

PUMA SX 2200 GC

WARRANTY 2 YEARS

The PUMA SX family is specially designed for heavy duty applications and features new functions such as the advanced TIG LIFT mode with control of slope up and down (SX 2200 GC). The digital display allows the setting of Arc dynamism for improved arc stability in all welding applications. The GC range is an industrial range, compatible with the use of motor-generators and for welding with all types of MMA electrodes including cellulosic.

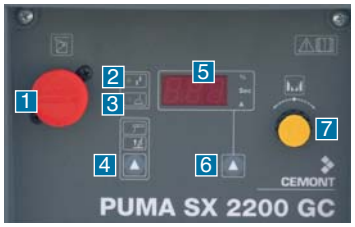


Features and product advantages:

- Compatible with motor-generators.
- 2 years warranty. Safe and reliable.
- Digital display: precise adjustment and reading of the parameters (SX 2200 GC).
- Comfortable: over-intensity when starting and anti-stick device (adjustable on SX 2200 GC).
- Suitable for welding with cellulosic electrodes.

Standards
EN 60974-1
EN 60974-10

2006-682



2006-861

1. Remote control plug.
2. Alarm indicator.
3. Current output indicator.
4. Welding Process Selection Key.
5. Parameter display .
6. Welding parameter selection key.
7. Parameter adjustment.

TECHNICAL CHARACTERISTICS:

		PUMA SX 2200 GC
Input voltage 50/60 Hz		400 V Three-phase
Input power		9.8 kVA - 7.2 kW
Max input current		14.2 A
Effective input current		9 A
Open circuit voltage		105 V
Welding current range		5 - 220 A
Duty cycle	at 30%	220 A (40%)
	at 60%	190 A
	at 100%	150 A
Connector size		13 mm
Protection index		IP 23
Dimensions		180 x 250 x 400 mm
Weight		8 kg

Accessories
see page 2-16

TO ORDER:

Power source only	**W000263688**
Option	
Remote control	**W000242069**

Delivered equipped with:

- primary cable,
- safety instructions,
- user manual.

PUMA POWER 1700 / 2000

WARRANTY 2 YEARS

SAVE ENERGY

MOTOR GENERATOR COMPATIBLE

Improved performance:

- Higher duty ratio (180 A - 20% / 160 A - 30%).
- Better compatibility with the generators thanks to the POWER controller.
- Long primary cables (70 m – diameter of 2.5 mm^2).
- Excellent priming, Hot Start, Anti-adhesion.
- Welding of all types of electrodes (except cellulosic).

Standards
EN 60974-1
EN 60974-10

TECHNICAL CHARACTERISTICS:

		PUMA 1700 POWER	PUMA 2000 POWER
PRIMARY			
Power supply		230 V single-phase	
Frequency		50/60 Hz	
Input power		4.9 kVA - 4.85 kW	5.7 kVA - 5.65 kW
Max input current		21.5 A	25 A
Effective input current		15 A	
SECONDARY			
Open circuit voltage		48.4 V	
Welding current range		5 A - 160 A	10 A - 180 A
Duty cycle	at 20%	-	180 A
	at 30%	160 A	-
	at 40%	-	-
	at 60%	140 A	140 A
	at 100%	120 A	120 A
Protection class		IP 23	
Insulation class		H	
Weight		6.6 kg	
Dimensions		170 x 320 x 395 mm	

TO ORDER:

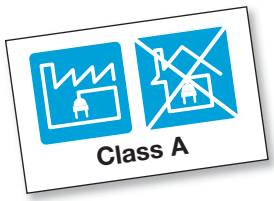
Power source only	**W000274931**	**W000270335**
Equipped version*	**W000278051**	**W000275041**

Reduced consumption:

- Uses a 16 A socket.
- All the models come with a standard socket.

Superior ergonomics:

- **Silent:** “intelligent fan”.
- **Light:** only 9 kg.
- Compact design.



Accessories
see page 2-16

THE TECHNICAL SOLUTION RESPECTING THE LIMITATION OF HARMONICS

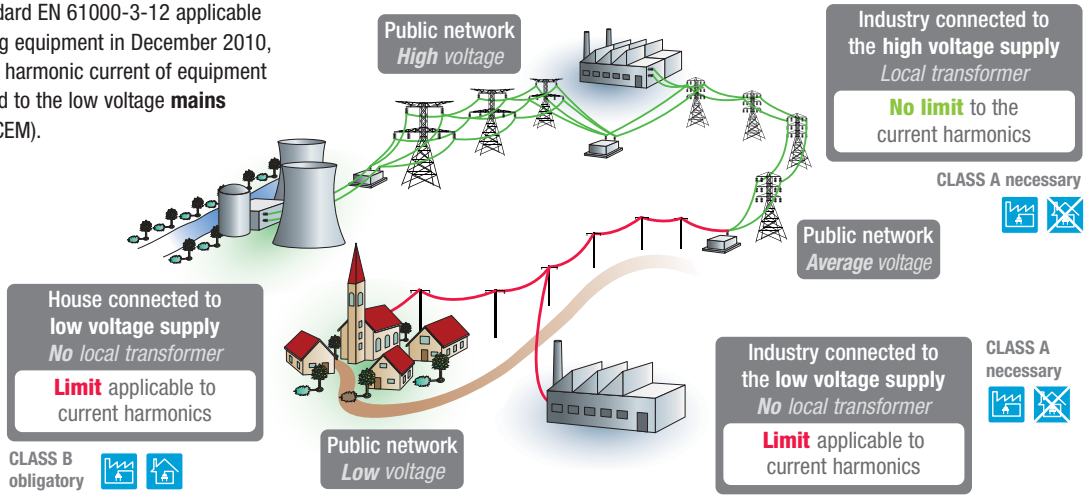
Delivered equipped with:

- power cable,
- safety, user and maintenance manual.

*** Equipped version also with:**

- cable, earth clamps, electrode clamps and fittings.

The standard EN 61000-3-12 applicable to welding equipment in December 2010, limits the harmonic current of equipment connected to the low voltage **mains supply** (CEM).



PUMA 2000 XL

WARRANTY 2 YEARS

Improved performance:

- Higher duty ratio (160 A at 50%).
- Better compatibility with the generators thanks to the POWER controller.
- Long primary cables (70 m - diameter of 2.5 mm²).
- Excellent priming, Hot Start, Anti-adhesion.
- Welding of all types of electrodes (cellulosic).
- Equipped with the VRD (Voltage Reduction Device) for improved safety

Reduced consumption:

- Uses a 16 A plug.
- This model come with a standard plug.

Superior ergonomics:

- **Silent:** "intelligent fan".
- **Light:** only 9 kg.
- Compact design.

SAVE ENERGY

MOTOR GENERATOR COMPATIBLE

THE TECHNICAL SOLUTION RESPECTING THE LIMITATION OF HARMONICS

Standards
EN 60974-1
EN 60974-10

2010-076

Class A

TECHNICAL CHARACTERISTICS:

		PUMA 2000 XL	
PRIMARY			
		MMA	TIG
Power supply		230 V single-phase	
Frequency		50/60 Hz	
Input power		4.8 kVA - 4.78 kW	
Max input current		21 A	14 A
Effective input current		16 A	11 A
SECONDARY			
Open circuit voltage		75 V	
VRD no load voltage		14 V	
Welding current range		5 A - 160 A	
Duty cycle	at 50%	160 A	-
	at 60%	150 A	160 A
	at 100%	130 A	130 A
Protection class		IP 23S	
Insulation class		H	
Weight		9 kg	
Dimensions		185 x 300 x 435 mm	

Accessories
see page 2-16

TO ORDER:

Power source only	**W000271808**
Equipped version*	**W000278048**

Delivered equipped with:

- power cable,
- safety, user and maintenance manual.

*** Equipped version also with:**

- cable, earth clamps, electrode clamps and fittings.

YARD SV 263 / SV 333 SV 403 / SV 443

WARRANTY 2 YEARS

YARD power sources are rectifiers for MMA coated electrode welding. They are well suited for both workshop and outdoor working conditions. Easy to use with adjustment using the shunt, they are for professional and intensive applications.

POWERFUL ROBUST

Standards
EN 60974-1
EN 60974-10

Features and product advantages:

- **Input voltage:** bi-tension 230 V - 400 V three-phase.
- **Simple:** power adjustment by shunt.
- **Easy to set:** linear control.
- **Cooling:** forced air cooling fan.
- **Practical:** due to the large diameter wheels and handle.
- **Versatile:** able to weld all types of electrodes (including cellulosics).

1 Switch on/off and primary voltage selection.
2 Current adjustment.
3 Welding current indicator.
4 Welding cables connectors.

Accessories
see page 2-16

TECHNICAL CHARACTERISTICS:

		YARD SV 263	YARD SV 333	YARD SV 403	YARD SV 443
Three-phase input voltage		230 - 400 V triphasé			
Input power		14.5 kVA - 8 kW	16.9 kVA - 10 kW	22.8 kVA - 13 kW	31.2 kVA - 18 kW
Max input current		36 A - 21 A	43 A - 25 A	57 A- 33 A	78 A - 45 A
Effective input current		21.5 A - 12.5 A	25 A - 15.5 A	34 A - 19.5 A	52 A - 30 A
Open circuit voltage		62 V - 66 V	61 V - 66 V	63 V - 70 V	71 V - 79 V
Welding current range		45 - 220 A	55 - 260 A	50 - 325 A	60 - 400 A
Duty cycle at 40 °C	at 35%	220 A	260 A	325 A	400 A (45%)
	at 60%	170 A	200 A	250 A	345 A
	at 100%	130 A	155 A	190 A	265 A
Connector size		13 mm			
Protection index		IP 21			
Dimensions (mm)		450 x 620 x 890	560 x 730 x 1080		
Weight		57 kg	83 kg	107 kg	123 kg

Delivered equipped with:

- primary cable,
- safety instructions,
- user manual.

TO ORDER:

Power source only	W000263691	W000263693	W000263695	W000263696

YARD 400 SX

The YARD 400 SX station was designed using thyristor technology, internationally recognized as strong, high performing and reliable. The YARD 400 SX has already been tested in all kinds of field such as the manufacture of transport equipment, naval construction, repair, etc. The YARD 400 SX is ideal for intensive work with coated electrodes (cellulosic types included) and for gouging.

INTENSIVE VERSATILE (electrode/ gouging/TIG DC)

Standards
EN 60974-10

Features and product advantages:

- **Power supply:** dual-voltage 230 / 400 V three-phase.
- **Intensity regulation:** electronic.
- **Display:** digital A / V.
- **Versatility:** EE / TIG DC / Gouging.
- **Flexible:** possibility of modifying the Hot Start and arc dynamism.
- **Professional:** steel structure on wheels, retractable beams and lifting rings.
- **Remote control:** easy control at a distance.

1. on/off switch and primary voltage switch.
2. Control knob.
3. A/V digital display.
4. EE/TIG control.
5. Hot Start/Arc dynamism regulation.
6. Connector for remote control.

TECHNICAL CHARACTERISTICS:

		YARD 400 SX
Power supply		230 - 400 V three-phase +/- 15% 50/60 Hz
Input power		26 kVA - 20 kW
Max input current		69 A - 40 A
Effective input current		40.6 A - 23.5 A
Open circuit voltage		68 V - 75 V
Welding current range		10 - 400 A
Duty cycle at 40 °C	at 35%	400 A
	at 60 %	300 A
	at 100%	230 A
Size of connector		13 mm
Electrode diameter		1.6 to 6.3 mm
Protection class		IP 23
Dimensions		1000 x 600 x 600 mm
Weight		128 kg

Remote control

Accessories
see page 2-16

TO ORDER:

Power source only	**W000272668**
Equipped version*	**W000275044**
Option	
Remote control	**W000219557**
Option 42 V	**W000260682**
VRD	**W000275160**
TIG case	**W000305050**

Delivered equipped with:

- primary cable,
- safety, user and maintenance manual.

*** Equipped version also with:**

- cable, earth clamp, electrode clamp and fittings.

YARD 650 SX

WARRANTY 2 YEARS

The new YARD 650 SX uses electronic regulation for control of the welding current. Designed for adverse conditions, the YARD 650 SX is reliable and sturdy, dedicated to heavy duty applications from steel construction to shipyards. An 8-bit processor controls the welding process, protects the equipment and informs the welder of the current state. The YARD 650 SX is the solution for MMA welding, TIG lift welding and ARCAIR gouging.

Features and product advantages:

- Digital display for precise parameter regulation and monitoring.
- Process selector: MMA, TIG lift, gouging, MIG/MAG welding.
- 42 V DC current up to 150 A available.
- 48 V AC auxiliary current available as an option (up to 32 A).
- Remote control (option).
- Compensation of input voltage variations.
- Hot start and Arc Force regulation available for improved arc starting and stability.

MULTI PURPOSE APPLICATIONS ROBUST AND POWERFUL

Standards
EN 60974-1
EN 60974-10

2008-786

2008-787

1 Switch on/off and primary voltage selection.
2 Regulation knob.
3 Digital display A/V.
4 Hot Start / Arc Force adjustment.
5 Remote control connection.

TECHNICAL CHARACTERISTICS:

		YARD 650 SX
Three-phase input voltage		230 V - 400 V - 50/60Hz
Input power		40 kVA - 38 kW
Max input current		102 A - 60 A
Effective input current		61.5 A (230 V) - 35.4 A (400 V)
Open circuit voltage		68 V - 75 V
Welding current range		10 A - 630 A
Duty cycle at 40 °C	at 35%	630 A
	at 60%	470 A
	at 100%	370 A
Connector size		13 mm
Protection index		IP 23
Dimensions		1000 x 600 x 600 mm
Weight		176 kg

Accessories
see page 2-16

TO ORDER:

Power source only	**W000272669**
Option	
Remote control	**W000219557**
48 V socket for auxiliary services	**W000260682**

Delivered equipped with:

- primary cable,
- safety instructions,
- user manual.

MMA WELDING KIT (ELECTRODE HOLDER + EARTH CLAMP)

ACCESSORIES KITS					
Name	**16C25**	**25C25+**	**35C50**	**50C50**	**50C50+**
Connector size	Ø 9 mm²	Ø 9 mm²	Ø 13 mm²	Ø 13 mm²	Ø 13 mm²
COLT*	W000260680	-	-	-	-
PUMA **PUMA POWER**	- -	W000011138 -	- W000268854*	- -	- -
PUMA SX / YARD SV 263 **PUMA XL**	- -	- -	W000011139 W000268856*	- -	- -
YARD SV	-	-	-	W000260681	-
YARD 400SX / YARD 650SX	-	-	-	-	W000260682

** with welding mask + hammer and brush*

2009-163

MMA OPTIONS:

	COLT	PUMA	PUMA SX	YARD SX
Remote control	-	-	W000242069*	W000215557
TIG torch with valve	**WTT2 9V 4 m** W000278878		**WTT2 26V 4 m** W000278885	

** PUMA SX 2200 GC only*

2010-686